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**Ozone Reactions
in Aqueous Solutions --
A Bibliography**

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Ozone Reactions in Aqueous Solutions -- A Bibliography

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OZONE REACTIONS IN AQUEOUS SOLUTIONS

-- A BIBLIOGRAPHY

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A reaction oriented list of references is provided for published papers and reports containing rate data or information on mechanism for reactions of ozone with various substrates in aqueous solutions. Catalyzed, as well as uncatalyzed, reactions are included. One hundred and sixty-four papers are listed. The period covered extends from 1913 to 1981.

Key words: aqueous solution; bibliography; chemical kinetics; decomposition; mechanism; oxidation; ozone; rate constant; reaction.

This bibliography lists papers and reports on the reactions of ozone with various substrates in aqueous solutions. Catalyzed reactions, as well as uncatalyzed reactions, are included.

The first study of ozone reactions in aqueous solutions was performed in 1913 by V. Rothmund and A. Burgstaller, who studied the rate of decomposition of ozone in water. In 1917 the same authors studied the reaction between ozone and hydrogen peroxide. The study of ozone decomposition in water was continued by F. Kawamura (1932), K. Sennewald (1933), F. Weiss (1935), W. C. Bray (1938), and H. Taube and W. C. Bray (1940). H. Taube examined the reactions of ozone with formic acid (1941), with bromide ion (1942) and chloride ion (1949). Ozone decomposition was studied again by M. C. Alder and G. R. Hill (1950), W. Stumm (1954), E. Abel (1955), and Kilpatrick et al. (1956), while E. Abel studied also the reaction of ozone with hydrogen peroxide. Since 1970 there has been a large increase in the number of papers published in this subject area. The present bibliography includes 164 papers and reports dealing with such reactions. The period covered extends from 1913 to 1981.

GUIDELINES FOR THE USER

ARRANGEMENT OF THE REPORT

This bibliography is in two parts:

Part I. Guide to data contained in references. Each entry consists of a reference code and a property code. These are discussed below.

Part II. References

Ordering of Entries

In both parts of this report, entries are ordered chronologically beginning with the earliest papers and within each year alphabetically by author's name.

Reference Code

Each paper or report included in Part I is indicated by a brief reference code consisting of a string of characters showing:

- 1) Year of publication (last two digits)
- 2) Author or first two authors, using the first three letters of each last name (patronymic). When two names are present they are separated by a slash.
- 3) If necessary, a digit is added to distinguish among papers that would have the same code according to rules (1) and (2).

Examples:

42 TAU
70 SHA/KOZ
72 IVA/NIK
72 IVA/NIK2

The total length of the string, including the digit, may be no longer than 11 characters. A code without added digit has, implicitly, the digit 1 associated with it.

Property Code

The property code follows the reference code for each entry in Part I. The code consists of abbreviations which are used for data flagging. In this publication only the following listed four abbreviations are used for data flagging:

Dec	(Decomposition)
Mec	(Mechanism)
RR	(Reaction Rate Data as: Rate constant, relaxation time, etc.)
Rxn with:	(Reaction with other compounds)

References

Part II includes the same reference codes (or "short references") as Part I, in the same order, followed by the complete reference which gives: the name of author(s), the full title of the paper, and the name of the journal followed by the volume number, page, and year of publication. The full reference format is demonstrated below:

50 ALD/h1L Alder, M. G., and Hill, G. A., "The Kinetics and Mechanism of Hydroxide Ion Catalyzed Ozone Decomposition in Aqueous Solution," J. Am. Chem. Soc. 72, 1884 (1950).

Part I. Guide to Data Contained in References.

For explanation of reference codes and property codes used see Guidelines for the User.

13 ROT/BUR	Dec, RR
17 ROT/BUR	Rxn with: H_2O_2 ; RR
32 KAW	Dec, RR
33 SEN	Dec, RR
34 KAW	Dec, RR
35 WEI	Dec, Rxn with: H_2O_2 ; RR
37 VAS/KAS	Rxn with: $\text{SO}_2 + \text{H}_2\text{O}$; Mec, RR
38 BRA	Rxn with: H_2O_2 ; RR
40 TAU/BRA	Rxn with: H_2O_2 ; Mec, RR
41 TAU	Rxn with: HCOOH ; Mec, RR
42 TAU	Rxn with: Br^- , Mec, RR
48 HIL	Rxn with: CO_2^{2+} ; Mec, RR
49 YEA/TAU	Rxn with: Cl^- ; RR
50 ALD/HIL	Dec, Mec, RR
54 STU	Dec, RR
55 ABE	Dec, Mec
55 ABE2	Rxn with: H_2O_2 ; Mec, RR
56 KIL/HER	Dec, RR
58 KLE/NAL	Rxn with: CH_3OOH ; RR
59 KHA/BAR	Rxn with: CN^- ; RR
61 SON/DOD	Rxn with: CN^- ; Mec
62 RAU/SII	Dec, RR
65 CON/HAM	Rxn with: Fe^{+2} ; RR
67 LUN/KUS	Rxn with: NO_2^- , SeO_3^{2-} , AsO_3^{3-} , PO_3^{3-} , Ag^+ , Mn^{2+} ; Mec
67 WAG/ECK	Rxn with: Cu^{2+}
68 CZA/SAM	Dec, RR
68 EIS	Rxn with: $\text{C}_6\text{H}_5\text{-OH}$; Mec
68 GRI/SHA	Rxn with: N_2H_5^+ salts; Mec
68 ILN/KHE	Rxn with: Pyrenes and Anthracenes
68 SEN/IKE	Rxn with: Mn^{2+}
70 LUN/FRA	Rxn with: NO_2^- , HPO_3^{2-} , SeO_3^{2-} ; Mec

70 KAN/MOK	Rxn with: $\text{cy-C}_6\text{H}_{12}$; Mec
70 ROG	Dec, RR
70 SHA/KOZ	Rxn with Np(VI) ; RR
71 EIS	Rxn with: $\text{C}_6\text{H}_5\text{OH}$; Mec
71 HEW/DAV	Dec, RR
71 MER/LOV	Dec, RR
71 ROG	Rxn with: $(\text{CH}_3)_2\text{NH}$
71 SHE/MAR	Rxn with: Phosphanamide
71 VYA/DAV	Rxn with: Pu(IV)
72 BAL/SEL	Rxn with: CN^- ; RR
72 DON/EHR	Rxn with: Carbon black; Mec
72 GOU	Rxn with: $\text{C}_6\text{H}_5\text{OH}$; RR, Mec
72 IVA/NIK	Dec, RR, Mec
72 IVA/NIK2	Rxn with: Ce^{3+} , Ag^+ ; RR, Mec
72 KRI/MUR	Rxn with: $[\text{Re(en)}_2\text{O}_2]^+$; RR
72 PEN	Rxn with: SO_2 , NO_2 , H_2S ; RR
72 RAZ/GLO	Rxn with: $\text{C}_6\text{H}_5\text{OH}$; RR
72 VYA/DAV	Rxn with: Pu(IV) ; RR
73 DUD	Rxn with: Br^-
73 GOR/BAS	Rxn with: CH_3COCH_3
73 GOR/GOR	Rxn with: CH_3COCH_3 ; Mec
73 GOR/KOZ	Dec, RR, Mec
73 GOR/KOZ2	Dec, RR, Mec
73 GOR/VOD	Dec, Rxn with: RH , ROH , RCHO , R_2CO , etc.
73 KAN/MOK	Rxn with: $\text{cy-C}_5\text{H}_{10}$
73 SHA/VYA	Rxn with: Ce^{3+} ; RR, Mec
73 SHE	Rxn with: I^-
73 TAK/OKU	Rxn with: $\text{Na}_2\text{S}_2\text{O}_3$; Mec
74 GER/KUR	Rxn with: $\text{CH}_3\text{CH}_2\text{COCH}_3$; RR
74 GIL	Rxn with: mono-, and poly-Chlorophenols
74 GOR/BAS	Rxn with: Ag^+ ; RR, Mec
74 GOR/KOZ	Dec, RR, Mec
74 KOM/GER	Rxn with: $\text{CH}_3\text{CH}_2\text{COCH}_3$; RR, Mec

74 PAK/KRA	Rxn with: CH_3OH , $\text{CH}_3\text{CH}_2\text{OH}$, $\text{C}_4\text{H}_9\text{OH}$, $\text{C}_8\text{H}_{17}\text{OH}$
74 SHU/NIK	Rxn with: Ru(III) , Ru(IV)
74 ZAM/KUN	Rxn with: $\text{C}_6\text{H}_5\text{OH}$
75 CHT/AKO	Rxn with: W , WS_2
75 CHU/KOK	Rxn with: $\text{Pb(NO}_3)_2$
75 GOR	Dec
75 KOC/MEJ	Rxn with: Sulfonates and Sulfates
75 KUR/SAK	Rxn with: Tryptophan
75 LYS/ATY	Rxn with: $(\text{CH}_3)_2\text{NNH}_2$; Mec
75 MAT/FUJ	Rxn with: CN^- ; RR
75 NIK/IVA	Rxn with: Np^{4+} , Pu^{4+} ; RR, Mec
75 TAR/MAR	Rxn with: α -Naphthol
75 TYU/YAK	Rxn with: Sulfates, Pyridines, Pyrazoles, Nicotinic Acid; RR, Mec
75 VEB/GAE	Rxn with: Acrylonitrile
76 CHU	Rxn with: Sn^{2+}
76 CHU/MAS	Rxn with: NCS^-
76 HOI/BAD	Rxn with: Benzene, o-Xylene, Styrene, Aniline, Phenols, Alcohols; RR
76 JOY	Rxn with: Arylsulfonic acids
76 KHE/DUD	Rxn with: Br^-
76 PEL	Dec
76 TOZ/NIS	Rxn with: As(III)
77 CHE/LEB	Rxn with: Ce(III) , Bk(III)
77 ERI/YAT	Rxn with: SO_2 ; RR, Mec
77 GAL/GAL	Rxn with: 1-(p-Nitrophenyl)-2-acetylamino-1,3-propanediol
77 GIL	Rxn with: Maleic acid, Fumaric acid, Glyoxylic acid, Formic acid, Oxalic acid
77 GLA/TOM	Rxn with: aromatic amines, sulfanilic acid
77 GOB/CHU	Rxn with: Br^- , I^- ; RR, Mec
77 GOR/SIM	Rxn with: $\text{CH}_3\text{CH}_2\text{COCH}_3$; Mec
77 KOV/YAV	Rxn with: Na_2S ; RR
77 KUO/LI	Dec, RR
77 PRE/MAU	Rxn with: $\text{C}_6\text{Cl}_5\text{OH}$, $\text{C}_6\text{H}_4\text{Cl}_2$, $\text{C}_4\text{H}_8\text{Cl}_2$, CHCl_3 , Chlorinated biphenyls
77 RIZ/AUG	Rxn with: $\text{C}_6\text{H}_5\text{OH}$; RR
77 SHA/YAK	Rxn with: Cumene

77 TAR/MAR	Rxn with: S-ethyl-N,N-di-n-propylthiocarbamate
77 TAR/MAR2	Rxn with: Zinc dimethyldithiocarbamate and tetramethylthiuram disulfide
77 TYU	Rxn with: Alkylpyridines
77 TYU/YAK	Rxn with: Alkylpyridines and Alkylpyrazoles; Mec
77 YOC	Rxn with: Styrene
78 AUG/RIZ	Rxn with: C_6H_5OH ; RR
78 AUG/RIZ2	Rxn with: C_6H_5OH ; RR, Mec
78 CHU	Rxn with: Pd^{2+} , Pt^{2+}
78 GIL	Rxn with: aliphatic and aromatic acids, cresols, glyoxal
78 HOI/BAD	Rxn with: NH_3 ; RR
78 ISH/DOB	Rxn with: Alcohols, Phenols, Cyanohydrins, Amines, Aromatic amines, Benzothiazole
78 JOY/GIL	Rxn with: Alkylbenzenesulfonic acids
78 KAS/MAT	Rxn with: CN^- ; RR
78 LAR/HOR	Rxn with: SO_2 ; RR, Mec
78 MOR/IKE	Dec, RR
78 OEH	Rxn with: Organic compounds (Review)
78 ONA	Rxn with: Azo Dyes; RR, Mec
78 PRA	Rxn with: Br^-
78 PRE/MAV	Rxn with: Pesticides (Malathion, Baygon, Vapam, DDT)
78 SHA/KOL	Rxn with: Caffeine
78 SKU	Rxn with: Sodium Alkylbenzenesulfonates
78 SKU2	Rxn with: Sodium Alkyl-naphthalenesulfonates
78 SUZ/IIZ	Rxn with: Polyacrylamide
78 YAK/DNE	Rxn with: I^- , Mn^{2+} ; RR
78 YOC	Rxn with: Styrene, Bromobenzenesulfonic acid
79 BEL	Dec, RR
79 GOR/BAS	Rxn with: CH_3COCH_3
79 HEA	Rxn with: 2-amino-2-(hydroxymethyl)-1,3-propanediol and 2-(N-morpholino)-ethanesulfonic acid
79 LI/KUO	Rxn with: C_2H_6OH ; RR, Mec
79 MAR/OBO	Rxn with: Ethylenediamine
79 NAK/NAK	Dec, RR
79 RAZ/OVE	Rxn with: OH^- ; RR, Mec
79 STE/BEN	Rxn with: Water-soluble organic substances, Nitroaniline

79 SUL/ROT	Dec, RR
79 SUZ/TAU	Rxn with: Water-soluble polymers; RR
79 YAK	Rxn with: C_6H_5OH , Hydroquinone, Na 1-anthraquinone, Na Benzenesulfonate, Phthalic acid, Bromobenzenesulfonic acid
80 DUG/JAU	Rxn with: Glycine; RR
80 GIL	Rxn with: trans-trans Muconic acid; RR, Mec
80 HUA	Rxn with: 2,2',4,4',6,6'-Hexachlorobiphenyl; RR, Mec
80 JOY/GIL	Rxn with: p-Toluenesulfonic acid; Mec
80 KER/TAR	Rxn with: Azobenzene
80 KIR/LIT	Rxn with: Ethyl mercaptan
80 LIB/BOS	Rxn with: I^-
80 RUT/SZK	Rxn with: $HCHO$
80 SUL	Dec, RR
80 SUL/ROT	Dec, RR
80 SUZ/MIY	Rxn with: Poly(oxyethylene); RR
80 TYU	Rxn with: benzimidazole, benzotriazole, benzopyrazole; RR
80 TYU/BER	Rxn with: Alkylpyridines; RR
80 TYU/YAK	Rxn with: Mn^{2+} , Mn^{3+} ; RR, Mec
80 ZEE/VIS	Rxn with: CN^- ; RR, Mec
81 GUR	Dec; Rxn with: C_6H_5OH ; RR, Mec
81 HAR/TAK	Rxn with: Br^- ; RR, Mec
81 LEG/LAN	Rxn with: C_6H_5OH , Hydroquinone, Phenoxyacetic acid, Aniline
81 MAR/DAM	Rxn with: SO_2
81 MAT/TAK	Rxn with: NCO^- ; RR, Mec
81 MBA/MAN	Rxn with: Lignin
81 PAN/CHE	Rxn with: Methyl β -D-gluucopyranoside; RR
81 REU/OVE	Rxn with: C_6H_5OH ; RR
81 SIE/COW	Rxn with: NH_2NH_2 , CH_3NHNH_2 , $(CH_3)_2NNH_2$
81 TAK/KAT	Dec, RR
81 TER/SUG	Rxn with: CN^- ; RR
81 TYU	Rxn with: Fe^{2+} ; RR, Mec
81 TYU/DNE	Rxn with: Fe^{2+} ; RR, Mec
81 YAK	Rxn with: CH_3OH , $HCHO$, $HCOOH$; Mec

Part II. References

1913

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1917

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1932

- 32 KAW Kawamura, F., "Investigation of Ozone. I. The Solubility of Ozone in Water and in Dilute Sulfuric Acid," Nippon Kagaku Kaishi 53, 783 (1932); Chem. Abstr. 26:5477 (1932)

1933

- 33 SEN Sennewald, K., "Über den Zerfall des Ozons in Wasseriger Lösung," Z. Phys. Chem. Abt. A 164, 305 (1933)

1934

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1935

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1937

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1938

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1940

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1941

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1942

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1948

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1949

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1950

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1954

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1955

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1956

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1959

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1961

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1962

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1968

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1970

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